ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 1.] [1904.

I.—SOAP BARK TREE OF CHILI.

(*Quillaja saponaria*, Molina.)

The Quillai or Cullay of the Chilians is the Soap-bark of English commerce. The plant yielding it is an evergreen tree often 30 to 50 feet high, with small, smooth, shining, holly-like leaves. The flowers grow four or five together; the calyx is furnished with a star-like fleshy disk having five notched lobes; the petals are spathulate and white. The fruit is star-shaped, with five single cells containing numerous winged seeds in two rows. The plant belongs to the natural order *Rosaceæ* and is allied in essential characters (though very different in appearance) to the Spiræas, of which the common meadowsweet is the most familiar example. The tree is found on "the outer slopes of the Chilian Andes." It also extends to the southern part of Peru. In Chili it is said to be rather common in wooded valleys between 31° and 38° S. lat. It reaches, in some cases, elevations of nearly 6,000 feet above the level of the sea. The timber of large trees is very hard and durable, and it is in great request in mines. The chief economic value lies, however, in the bark, which has of late years formed the basis of a considerable industry. The bark is exported in fairly large quantities, the amount reaching this country being about 5,000 bales annually.

As may be gathered from the situations in which it is found, the tree should thrive in the climate of the South of Europe, also on mountain slopes in many parts of India, Ceylon, the West Indies, and in South Africa and many parts of Australia. Owing to its valuable economic properties, a good deal of interest was taken a few years ago by Kew in the introduction of the tree to India and to other British Possessions where it was likely to thrive. As will be shown later, a measure of success has attended its cultivation in the Nilgiris, and it has also been grown in South Australia, the West Indies, and in the South of Europe. A portion of the stem of a tree raised from seed supplied from Kew and grown by Sir Thomas Hanbury, K.C.V.O., at La Mortola was placed in the Kew Museum in 1884.

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The bark is rough and dark-coloured externally, but internally consists of numerous regular whitish or yellowish layers, and contains a large quantity of carbonate of lime and other mineral matters. It is also rich in *saponin*, a vegetable soap-principle somewhat widely diffused in certain families of plants. According to Le Beuf, quillaia bark is the best material for preparing saponin for technical purposes.

Quillaia bark has recently been proposed by Dr. R. Kobert (*Ther. Gaz.*, p. 606, from *Centralbl. für Klin-Med.*) as a substitute for senega. He has found that the two glucosides occurring in that root are present in quillaia bark in almost five times the proportion in which they occur in senega. As quillaia bark contains a tolerably constant proportion of the glucosides, and as it also contains a considerable amount of sugar, which gives the decoction a sweet taste, and is much cheaper than senega, it offers certain advantages over that drug. The experiments of Dr. Kobert are said to have proved that patients bear quillaia better than senega, that it rarely produces vomiting or diarrhœa, and is readily taken by children, while its expectorant action is beyond all question. The preparation used by Dr. Kobert was a decoction made from five parts of the bark to 200 of water, of which the dose was a teaspoonful for children and a tablespoonful for adults. The use of quillaia is contra-indicated in inflammation of the intestines or stomach, or in ulcerated states of the mucous membranes. (*Pharm. Journ.* xvi. [3], 289.)

In Chili, quillaia bark is reduced to powder and used as a substitute for soap in washing clothes, two ounces of the bark being sufficient to wash a dress. It is also said to remove all spots or stains, and to impart a remarkable lustre to wool. Further, it is used to wash the hair, for which purpose it is powdered between stones, then rubbed with the hands in water, making a foam like soap.

Although quillaia bark is not officinal in this country it is included in the last revision of the U.S. Pharmacopœia. It is also officinal in the new French Codex under the title of *Bois de Panama*, but the tincture prepared from it is chiefly employed as an emulsifying agent for the preparation of emulsions of various balsams and oils. A powder sold under the name of "emulsine" appears to consist essentially of saponin, or the saponaceous principle of quillaia bark. (*Pharm. Journ.* xvii. [3], 350.)

The late Dr. Schomburgk wrote as follows after receiving seeds at the Botanic Gardens, Adelaide, in 1884 ;—

"Through the kindness of Sir Joseph Hooker I received some seed of this remarkable tree. The bark consists of numerous layers, containing much carbonate of lime and other mineral matters, which render it so heavy that it sinks in water. It is in common use in Chili instead of soap, and has been introduced into England and recommended as a substitute for soap, especially for washing printed goods, silks and delicate coloured fabrics."

Mr. M. A. Lawson, F.L.S., gave the followiug account of plants raised on the Nilgiris in 1884 :—

Quillaja saponaria. A few only of the seeds of this Rosaceous plant which were sent from Kew have germinated. The plants,

however, which have been raised are doing well. The Quilaia is a native of Chili. It grows to the height of 60 feet, and its inner bark produces a saponaceous substance. This bark, after it has been ground into a powder, is used largely by the natives of the country in which it grows as a substitute for soap ; and is said to be superior to the ordinary mercantile soap for many purposes in the fuller's trade.

In 1886 Mr. Lawson gave the following further information on the subject :—

"*Quillaja saponaria.*—This plant thrives well in Ootacamund, and it is found that it can readily be propagated by means of cuttings, so that if it proves to be a tree of any value, it can be increased to any extent."

Since 1884 the trees on the Nilgiris have evidently done well. The following note shows that the bark of Indian-grown trees contains fully as much saponin as the bark imported into this country from South America :—

Mr. D. HOOPER, F.C.S., F.I.C., Quinologist to the Government of Madras, to ROYAL GARDENS, KEW.

The Laboratory, Ootacamund,
June 19, 1894.

DEAR MR. MORRIS,

* * * * *

You will be glad to know that the Quillaia Bark tree grows well here, and the bark of a ten-year-old tree contains as much saponin as the bark found in the London market. I do not know if the tree has been tried anywhere else in the East.

Yours sincerely,
(Signed) D. HOOPER.

The present position of quillaia bark in commerce in this country may be gathered from the following reports, which have been obligingly communicated to this establishment :—

Messrs. BURGOYNE, BURBIDGES, AND COMPANY, to ROYAL GARDENS, KEW.

12 and 16, Coleman Street,
London, E.C.,
July 16, 1894.

DEAR SIR,

WITH reference to your enquiry respecting quillaia bark, there is a good and increasing demand for this article ; prices at this moment rule low, the present quotations ranging from £12 to £12 10*s.* per ton nett.

With compliments,
I remain,
Yours faithfully,
H. ARNOLD.

J. R. Jackson, Esq., A.L.S.,
Royal Gardens, Kew.

Messrs. HAW & Co., to ROYAL GARDENS, KEW.

C 18, Exchange Buildings, Liverpool,
August 10, 1894.

DEAR SIR,

IN reply to your favour of yesterday, the Imports of Quillaia Bark into Liverpool for the three years ending 31st July, 1894, have been as follows :—

1891–1892—8,281 Bales.
1892–1893—7,595 „
1893–1894—3,620 „

During the Chilian War the price advanced to £33 per ton; since then it has gradually fallen, and it is now about £10; this is rather under the average value, but the fall in silver has depreciated the value of many articles, including this Bark, and it may be safer to consider £10 as the estimate than to work upon an average of a few years as a basis.

As regards the uses to which the product is applied, it was first recommended on account of its cleansing properties, and was then applied to the washing of silks and wools; we believe it is bought rather extensively for this purpose. It is no doubt also used for minor purposes by druggists, but we are sorry that our knowledge is not sufficiently practical to enable us to assist you with information on this point.

We remain, etc.,
(Signed) HAW & Co.

D. Morris, Esq., C.M.G., D.Sc.,
Royal Gardens, Kew.

II.—A HARDY INDIA-RUBBER TREE.

(*Eucommia ulmoides*, Oliver.)

(With Plate.)

In the *Kew Bulletin* for 1901 (pp. 89–94), under the title "Gutta Percha from a Chinese Tree," some account is given of this interesting discovery.

The figure given by Professor Oliver in *Hooker's Icones Plantarum* (pl. 2361) is now reproduced.

To this may be added the following interesting note kindly furnished by Dr. Henry, the well-known Chinese botanist :—

Tu Chung is the name given by the Chinese to the tree, which has been described by Prof. Oliver as *Eucommia ulmoides*. The bark is the only part used, and is much esteemed by the Chinese as a drug, tonic and various other properties being assigned to it. It is described in nearly all Chinese works on materia medica and botany, the earliest mention of it being given in the herbal of which the Emperor Shên-Nung is the reputed author, and which was committed to writing probably as early as the first century of our era.

The tree is cultivated in small plantations in the mountainous regions of Szechwan, Hupeh, and Shensi; and from these districts

M.S. del. et lith.

Eucommia ulmoides, Oliv.

it is brought to Hankow, the great mart for drugs that are produced in the western provinces. From this port about 100 tons are annually exported by steamer to the other treaty ports. The value of this export is put down in the Customs returns at about £18,000; the price varies much from year to year and with the quality of the bark.

In the Customs List of Medicines mention is made of a small export, about 100 pounds annually, from Pakhoi, and this is said to be produced in the province of Kwangsi.

On my trip to the mountains which lie north-west of Ichang, I was not fortunate enough to come upon the tree in the wild state, but the natives report that it is occasionally to be met with wild in the woods on the great mountain range that form the water parting of the Han and Yangtze rivers; and I was regaled with a story of a lawsuit which had been brought by a man in the Fang district, against the purchaser of a tree which had been unwittingly sold as firewood, but turned out to be the valuable *Tu Chung* tree.

It was stated in the *Kew Bulletin* (l. c. p. 93) that "*Eucommia ulmoides* promises to be hardy at Kew." As will be seen from the following note by Mr. W. J. Bean, the Assistant Curator, this expectation has been fully realised :—

Eucommia ulmoides has been grown out of doors at Kew without any protection for the last six years. None of the winters during that period have been very severe, but on one or two occasions about 20° Fahr. of frost have been registered. The plants have never been in the least affected, and I have very little doubt but that the species will prove quite hardy in most parts of Great Britain.

It is a vigorous, free-rooting plant and bears transplanting well. It will, I believe, thrive in any soil of average quality, but seems to prefer a rich light loam. In such a soil at Kew, young trees struck from cuttings five years ago are now 6 feet high and make shoots 2 feet to 2½ feet long in one season.

It can be propagated easily by means of cuttings, and with these two methods may be adopted. The quickest method is to take pieces of the current season's growth, about 6 inches long, in late July or early August, insert them in pots of very sandy soil (the usual mixture for cuttings), and then place the pots in a house or frame where slight bottom-heat can be afforded. The cuttings should be made of shoots in what gardeners term a "half-woody" condition. They will take root in a few weeks and can then, after a "hardening-off" period, be planted in nursery beds. The second method is to make the cuttings of the leafless wood in November and dibble them in sandy soil in a cool frame or out of doors under a *cloche* or hand-light. They will take root the following spring. This method is not so quick as the other, nor have we found it so sure.

We have had no experience with plants raised from seed, but we find that with plants raised from cuttings it is necessary, in order to make them assume a tree-like form, that they should be pruned for the first few years. This pruning consists in keeping

the plant to a single leader by the removal of rival ones, the shortening back of side shoots that have become unduly vigorous, and the gradual removal of the lower branches as the tree increases in height till a clean trunk of (say) 6 feet has been formed. Unless the plants are pruned they assume a more or less bushy form.

III.—ALDER CLOG SOLES.

A complete series of specimens illustrating the manufacture of clog soles from the wood of *Alnus glutinosa* has recently been added to the Museums through the instrumentality of Mr. Herbert Robertson, M.P.

The specimens were obtained from Mr. John Beattie, of Enniscorthy, Co. Wexford, Ireland.

It appears that the stems, when about 6 inches or more in diameter, are cut into lengths of about 1 foot; these are split longitudinally and cut into shape on the spot and then exported to Lancashire or Scotland for the finishing process. The following article, copied from the *Timber News and Saw Mills Engineer* for October 8th, 1900, describes this industry under the heading of "Alder and Birch for Clog Soles":—

"The quantity of timber annually required for the manufacture of clog soles is much greater than one would imagine. To supply the Liverpool market alone, vast quantities of fair-sized birch, alder, and sycamore are required; but as the making of the clog soles usually takes place in the woodland where the trees are felled, only the converted wood in the shape of rough soles is conveyed to the towns and villages—the refuse being sold at a cheap rate for firewood. The timber most in request is that of clean growth and not too large—about 8 to 12 inches in diameter—and alder is usually preferred, it working readily and producing a nice clean sole of good lasting properties and not liable to splinter or crack. With wonderful rapidity is the work of converting the rough log into the clog sole proceeded with. First, the timber is cross-cut into lengths, then split into thickness, and finally, by a neatly contrived knife fitted to a block, the soles are cut out to almost the finished shape and dimensions.

"From 8*d.* to 10*d.* per cube foot is the price usually paid for small alder, birch, and other timber suitable for clog-making, with an allowance from the seller that the soles may be cut out in the wood where the trees have been felled, this minimising considerably the expenses connected with unnecessary haulage and cartage."

Other interesting illustrations of the application of alder wood will be found in Museum No. 1.

IV.—CHINESE LACQUER.

(*Rhus vernicifera*, DC.; *Rhus sylvestris*, S. et Z.)

There were lately received at Kew samples of Chinese varnish from Dr. Augustine Henry, Ichang. These were obtained from species of *Rhus* growing at Patung. Specimens marked E were obtained from *Rhus vernicifera*, DC., the well-known lacquer tree of Japan; while specimens marked F were obtained, according to botanical specimens (No. 4893), from *Rhus sylvestris*, S. et Z.

Dr. Henry was anxious to obtain a special report on the relative merits of these varnishes which has been kindly furnished to this establishment by Dr. J. K. Crow, F.C.S.

Report on some Samples of Chinese Lacquer, by Mr. J. K. Crow, D.Sc., F.C.S.

Two samples, marked E and F, were handed in to me for examination from the Royal Gardens, Kew. Sample E was described as the juice of *Rhus vernicifera*, and F as that of *R. sylvestris*. These juices are used as varnishes or lacquers in China, and consist of pasty liquids of a drab or grey colour, rapidly turning dark on exposure to the air, and becoming coated with a thick tough skin. They are very similar to the lacquers described previously by S. Ishimatyu (Manchester Lit. and Phil. Trans., Feb. 18th, 1879) and by H. Yoshida (Chem. Soc. Journ., 1883, No. 472), and in my examination of them I have followed out to some extent the lines laid down by the latter chemist. Sample E obtained from *R. vernicifera*, the variety of sumach usually employed for the preparation of Japanese lacquer or *urushi*. Exposed in a thin layer to the atmosphere under ordinary conditions, it took about five days to dry, while in moist air two days were sufficient, and in dry air a month was not long enough. The urushic acid was extracted by repeated treatment with cold absolute alcohol, but was found to represent only 37 per cent. against 85 per cent. in the samples analysed by Yoshida. The latter, however, represents his urushi as having been procured under official inspection, and being in the purest form obtainable. The fact that urushic acid by itself does not dry, as stated by Yoshida, was also noticed. The lead salt of this acid was prepared and analysed: 31·22 per cent. of Pb being obtained, a result which agrees fairly well with the formula $(C_{14}\ H_{17}\ O_2)P_2$ suggested by Yoshida. The residue after the alcoholic treatment contained of course a larger portion of diastatic matter (the active agent in exciting the drying or oxidation) than the original sample, but when exposed to moist air thickened only, without formation of a skin or change of colour, even after the lapse of a month. Probably, therefore, this was due to the presence of some added foreign matter of a non-drying nature, possibly the "mokuyiki" mentioned by Yoshida as mixed with urushi when the latter is sent into the market. This body was soluble in ether, and represented about 45 per cent. of the total. The residue after extraction with ether consisted of the gum, diastatic matter, and accidental

impurities, such as bits of dried varnish skins, wood, etc. The gum was estimated by boiling with water, but did not amount to anything like the quantity obtained by Yoshida.

Sample F, from *Rhus sylvestris*. This was examined in the same way as E, and turned out to be a fairly pure sample. In drying qualities it far surpassed E, becoming surface dry in moist air in 1½ hours, and dry through in from 4 to 5 hours. Alcohol extracted about 45 per cent. of urushic acid, giving 30·90 per cent. Pb in its lead salt. The remainder was insoluble in ether, and consisted as before of gum, diastatic matter and mechanical impurities, these latter, however, being present in rather large quantities.

Subjoined are given the results of analysis :—

—	E	F
Urushic acid	37·5	45·9
Gum	0·4	1·2
Diastatic matter and impurities	7·2	19·3
Mokuyiki (?)	45·1	—
Water and other volatile matter (by difference) ...	9·8	33·6
	100·0	100·0

I may add that by direct estimation the water and volatile matter in F was found to be 33·4 per cent. The analysis of F shows great similarity with the figures obtained by Ishimatyu from a sample bought at Tokio.

The question of the drying of these lacquers is a very interesting one. I have repeated the experiments of Yoshida on this subject with results that bear out the conclusions at which he arrived. The whole of the phenomena attendant on the drying of the urushi lacquers appear to point to the presence of a ferment which determines the oxidation, and can only exhibit its greatest activity in a moist atmosphere and between certain well-defined ranges of temperature, being permanently destroyed if the heat be raised too high.

J. K. C.

The following notes record the results of attempts to introduce the Varnish tree into India.

Mr. Duthie reported from Saharunpore in 1884 :—

Rhus vernicifera is the famous Japanese varnish tree used for lacquering various articles, such as furniture, &c. I received some seed from the Director of the Royal Gardens, Kew. About 25 plants have already been raised, and more may yet germinate, judging from the appearance of the seed.

Further in 1885 :—

The plants of this valuable tree, raised from seed received last year from the Royal Gardens, Kew, are in as healthy a condition as could be desired, but they are growing very slowly. Unless the rate of growth increases as they become older, it will take

many years before they are sufficiently large for tapping purposes. Another supply of seed was received from Sir George King, Calcutta, in August last, and sown as soon as received. A number of these germinated shortly after being sown, and several others have since appeared and are still appearing above ground. The stock at present numbers 35 plants.

And again in 1886 :—

The young seedlings have at last started into growth, and are now shooting up fast. The growth for the two years after they germinated did not average more than a foot, but this has been doubled since the commencement of the present hot season, and there is now no reason to doubt that this useful tree will thrive in this climate. A small plantation will be made next rainy season, and it will then be a question of time as to when the plants will be ready for tapping.

Mr. Lawson reported from Ootacamund in 1884 :—

Rhus vernicifera, or the Japan Lacquer plant.—Upwards of 100 plants have been raised from seed sent from Kew. The plants have not made satisfactory progress as yet. I do not think that the climate of Ootacamund quite suits them, and I intend to remove them at the proper times to Coonoor, Barliyár, and Kalhatti.

Mr. Gamble reported from the Nilgiris in 1885 :—

Rhus vernicifera seed was made over to the District Forest Officers by some collectors. In Ganjam, Bellary, and Cuddapah it failed to germinate, and in Godávari the results are not yet known. In the Nilgiris alone was it at all successful, and about 12 plants were reared, of which half have been made over to the Director of Government Parks and Gardens, who will be able to look after it more carefully, and the rest planted at Cairn Hill.

The Conservator would be glad if seeds distributed by the Board, or by the Director of Agriculture, could always be sent to him, so that he may select the best locality, and especially the one where there are the best appliances. As an example, *Rhus vernicifera* was sent to almost all districts, but in the Conservator's opinion, a tree of the kind, native of Japan, is unlikely to grow anywhere but on the hills, and it would have been better to have tried it in the Nilgiris only, with perhaps a small amount at Horsleykonda or Rámandrug.

V.—"BRAZILIAN OAK" WALKING STICKS.

(*Posoqueria latifolia*, R.S.)

For some years past the importation from foreign countries of rough material for the manufacture of walking sticks and umbrella handles have been very considerable. The constant demand for novelties in this direction has become very keen, and one of the most successful introductions is without doubt a stick which is known in trade by the widely different names of "Brazilian oak" and "Ceylon vine." This stick is valued for the

beauty of its appearance, being grooved or channelled in fine longitudinal lines and covered, especially near the knob or root part, with numerous small knots. It is also prized for its extreme rigidity and strength.

Notwithstanding that enormous quantities of these sticks have been for many years past, and are still, brought into the English market, the country of their produce, as well as their botanical source, have remained unknown. Latterly, however, it has been ascertained that they are imported into this country from Bahia. And with a view of tracing their origin the assistance of the British Consul at that port has been invited by the Director of the Royal Botanic Gardens through the Foreign Office. The following is an extract of a letter in reply from Mr. Consul Stevens to the Foreign Office, dated Bahia, January 1st, 1889 :—

"The plant grows in the forests of the northern portion of this Province, along the coast and country traversed by the Bahia-San Francisco line of railway, becoming more plentiful in the hollows of the hilly borders of the Alagoinhas-Timbo line. It needs a partially sandy soil at a temperature of 86° to 90° Fahr., and does not require much water. There is no limit to the supply of sticks cut from its numerous branches, and in their rough state as delivered in bundles of 100 at the terminus of the railway on this side they sell for 2 milreis per 1,000 sticks ; or, if picked and chosen, 3 milreis per 100, according to the shape and fancy heads ; and after all expenses and freight are added, reach England at an average of 1*d.* to 2*d.* English each stick, including the profit of the Bahia shipper.

"In late times, to economise freight, only some 12 or 14 inches of the top part of the sticks have been exported, as the generality are adapted to umbrella handles.

"The plant, erroneously believed by Englishmen to be a climbing vine, is in reality a shrub from 2 to 26 feet high and 3 inches in circumference, the stem being soft and pulpy.

"It is known locally as the 'Marmeleiro-do-Campo,' or wild quince, and is classed from what can be ascertained as the *Maprounea braziliensis* ; it grows rapidly in the localities mentioned, and when properly seasoned its sticks are almost as supple as ash. It flowers in February, and its fruit ripens in July, and when gathered comes to this market in marmalade and jelly of quality more appreciated than any other orchard or garden cydonia."

Detached leaves only were received with this letter, so that it was impossible to determine what the plant really was, though it was clear that it belonged to the natural order *Rubiaceæ*, and perhaps to the genus *Coussarea* ; from fruits received later on, however, it seems that the plant in question is a species of *Posoqueria* and probably *P. latifolia*, R.S. It is clear, therefore, that the sticks can have nothing to do with *Maprounea braziliensis* referred to in Consul Stevens' letter, as that plant is a shrub belonging to the natural order *Euphorbiaceæ*, the fruits of which are entirely different from those of *Posoqueria*. As stated by Consul Stevens, the fruits of the Marmeleiro-do-Campo are used for making a kind of marmalade or preserve, and a sample of this has been sent by him to the Kew Museum.

Messrs. Henry Howell & Co., who first brought the stick to our notice, write as to its introduction to commerce :—

180, Old Street, London, E.C.,
June 25, 1889.

DEAR SIR,

IN reply to your enquiry respecting the Brazilian oak, it is somewhat difficult to fix upon the exact date of its first introduction to this market as a walking stick, but it is as nearly as possible 14 years since our attention was first directed to it, and since that time we have used a very large quantity ; in fact it is now one of our staple woods for walking sticks and umbrella handles. At first its place of origin was unknown to us, but as it had the appearance of a vine and was reputed to come from the East, it was introduced under the name of "Ceylon vine."

We are much interested and pleased that your efforts to ascertain its scientific name and true home have been successful ; it will be a welcome addition to the valuable list of plants used in our manufactures which you have already published (*Journal of the Society of Arts*, Vol. XXXVI., pp. 1036, 1109, 1122, 1887–88), and which we have reason to believe will have an excellent effect in stimulating an interest in the raw products of our Colonies and foreign countries which can be used in our business, and so enlarging the base upon which we depend for our supplies of natural woods for walking sticks and umbrella handles.

We are, &c.,
(Signed) HENRY HOWELL & CO.

John R. Jackson, Esq.

VI.—ZAPATERO, OR WEST INDIAN BOXWOOD.

(*Tabebuia* [*Tecoma*] *pentaphylla*, Bth. and Hook. f.)

Till recent years the increased demand for boxwood (*Buxus sempervirens*) for the preparation of wood blocks for engraving led to the fear that the supply would fail. Many of the old forests in the Caucasus have become exhausted, and the concessions granted by the Russian Government to cut wood have been more than once withheld. Persian box also, for the same reasons, became scarce.

Consequent upon this the attention of those interested in the subject was directed to other woods which appeared likely to become useful substitutes, and a large number of hard woods have been experimented upon at different times, the results of which, up to the year 1884, were brought together by Mr. J. R. Jackson, late Keeper of the Museums of the Royal Botanic Gardens, in a Prize Essay written for the International Forestry Exhibition at Edinburgh in that year, and published in the *Journal of the Society of Arts* for April 10th and 17th, 1885 (pp. 566–600). One of the woods that came nearest to true boxwood in colour and general appearance was that of *Tabebuia pentaphylla*, Benth. and Hook. f. [*Tecoma pentaphylla*, D.C.]. It is a moderate-sized tree of Jamaica, Antigua, Montserrat, St. Lucia, Cuba, Panama, &c., and the wood is compact and very

fine, and even grained. Blocks for engraving have been prepared from it by Mr. Robson I. Scott, of Whitefriars Street, E.C., who reported upon it as follows :—"It is the only likely successor to box that I have yet seen, but it is not embraced as a deliverer should be; but its time may not be far off." The wood, however, has never come into use for engraving purposes, but a question was recently submitted to Kew by Messrs. Samuel F. Armitage & Sons, of Farnworth, near Manchester, as to the nature and character of a wood known as Zapatero Wood. In reply Messrs. Armitage were informed that the name was applied in Trinidad to the wood of *Peltogyne paniculata*, Bth., which is of a deep purple colour, similar in appearance to the wood known in British Guiana as Purple Heart, and furnished by an allied plant (*Copaifera Martii*, Hayne, var. *pubiflora*). Further correspondence, however, accompanied by specimens of the wood, proved that the Zapatero referred to by Messrs. Armitage and the Zapatero of Trinidad were totally distinct, the first-named being a light yellow wood resembling Box, and the last, as before stated, of a deep purple colour. Upon examining the yellow wood with the microscope it was found to agree closely with a wood known in commerce as West Indian Boxwood, which, in consequence of its straight and even grain, and the fact of its costing about one-third of that of true Boxwood, is now much used for making parasol and sunshade handles, weavers' shuttles, rules, thermometers, and other similar articles. Upon further comparison of these two woods with that of *Tabebuia pentaphylla*, they were found to be identical, thus proving that the Zapatero Wood and the West Indian Boxwood of English commerce are both produced by the plant just mentioned.

From the above facts it would appear that the wood of this species is now largely used in this country as a substitute for Boxwood, except for engraving.

VII.—MISCELLANEOUS NOTES.

Visitors during 1903.—The number of persons who visited the Royal Botanic Gardens during the year 1903 was 1,352,548. That for 1902 was 1,323,376. The average for 1893–1902 was 1,352,425. The total number on Sundays was 568,726, and on week-days 783,822. The maximum number on any one day was 73,566 on June 1, and the smallest 116 on June 19.

The detailed monthly returns are given below :—

January	18,638
February	37,903
March	75,024
April	168,884
May	152,322
June	219,823
July	164,319
August	265,148
September	145,586
October...	42,838
November	45,047
December	17,016

Mr. C. E. F. ALLEN, a member of the gardening staff of the Royal Botanic Gardens, has been appointed Forester to the Rhodesia Railways, Limited.

Mr. WILLIAM HENRY PATERSON, formerly a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Curator of the Botanic Station, Antigua.

Mr. JOHN WILSON CAMPBELL, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Superintendent of the Government Plantations, Perak, Federated Malay States.

Mr. C. W. SMYTHE, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Curator of the Botanic Station in Sierra Leone, in succession to Mr. J. P. Quinton, retired.

Mr. ROBERT HENRY LOCKE, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for Inda in Council, on the recommendation of Kew, a Probationer Gardener for employment in the Royal Botanic Gardens, Calcutta.

Mr. W. H. JOHNSON, F.L.S., formerly a member of the gardening staff of the Royal Botanic Gardens, and since 1898, Curator of the Botanic Station, Aburi, Gold Coast, has been appointed by the Secretary of State for the Colonies, Director of Agriculture for the colony.

Mr. JOHN THOMAS JOHNSON, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for India in Council, on the recommendation of Kew, a probationer gardener for employment in the Royal Botanic Gardens, Calcutta.

Mr. H. M. LEAKE, B.A., F.L.S., has been appointed by the Secretary of State for India in Council, on the recommendation of Kew, Economic Botanist to the Government of the United Provinces of Agra and Oudh, with charge of the Botanic Garden, Saharunpur.

Mr. T. PETCH, B.A., B.Sc., has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew Government Mycologist for Ceylon.

Gallery for Gymnosperms.—Some considerable rearrangements have been made in the Museums at the Royal Botanic Gardens, Kew. A new gallery, 130 feet long by 16 feet wide, at the back of Museum No. III., was opened on February 1st. To this the entire collection of Gymnosperms (Conifers, Cycads and Gnetaceæ, including *Welwitschia*) has been transferred. The space in Museum No. I. thus set free has been utilised in making a more effective display of its contents, which had become very much crowded.

The well-lighted wall-space in the new gallery has enabled the collection of maps and plans of the establishment at various periods to be brought together. Several of these have been contributed by H.M. the late Queen and by H.M.'s Office of Works and are of considerable historical interest. A set of the fine photographs of Kew in its various aspects, which were sent by the Government to the Paris Exhibition of 1900, are also shown, as well as an extensive series of photographs of coniferous trees in their native countries.

Tapang Tree.—In the *Kew Bulletin* for 1896 (p. 156), some particulars are given of this remarkable tree, which is represented in the North Gallery of Paintings, No. 530. The Timber Museum now contains a fine section of the wood presented by His Majesty the King. It is cut from a buttress and measures 10 feet 6 inches by 9 feet 3 inches. The tapang, tapan, or tappan, as it is variously spelt, *Koompassia excelsa*, Taubert (*Abauria excelsa*, Beccari) was first described by Dr. O. Beccari, who states that it is probably the tallest tree in Borneo, attaining a height of 70 to 80 metres, = 260 feet. The cylindrical part of the trunk is not proportionately large, but it is supported by very wide, flat buttresses, and Dr. Beccari gives the outside girth of a tree as nearly 70 feet. This slab was presented by Rajah Brooke to Admiral Sir Henry Keppel, who brought it to this country about forty years ago. It is a radial section through one of the buttresses.

In the *Bulletin* referred to above there is a mistake. The dimensions of the pod are those of the Kumpas, *Koompassia malaccensis*, not of the tapang, of which the pod is still unknown.

Research in Jodrell Laboratory in 1904 :—

Boodle, L. A.—Succulent Leaves in the Wallflower (*Cheiranthus Cheiri*, L.) (New Phytologist, Vol. III., pp. 39–46, Fig. in text.)

Boodle, L. A.—Secondary Tracheides in *Psilotum*. (New Phytologist, Vol. III., pp. 48 and 49.)

Boodle, L. A.—The Structure of the Leaves of the Bracken (*Pteris aquilina*, L.) in relation to Environment. (Journ. Linn. Soc. Bot., Vol. XXXV., pp. 659–669, with five Figs. in text.)

Boodle, L. A.—On the Occurrence of Secondary Xylem in *Psilotum*. (Ann. Bot., Vol. XVIII., pp. 505–517, t. 33, and seven Figs. in text.)

Hill, T. G.—The Seedling Structure of certain Piperaceae. (New Phytologist, Vol. III., pp. 46 and 47.)

Massee, G.—On a Method for rendering Cucumber and Tomato plants immune against Fungus Parasites. (Journ. Roy. Hort. Soc., Vol. XXVII., pp. 1–4.)

Massee, G.—On the Origin of Parasitism in Fungi. (Phil. Trans. Roy. Soc. B., Vol. 197, pp. 7–24.)

Massee, G.—A Monograph of the Genus *Inocybe*, Karst. (Ann. Bot., Vol. XVIII., pp. 459–504, t. 32.)

Salmon, E. S.—Cultural Experiments with the Barley Mildew, *Erysiphe Graminis*, DC. (Annales Mycologici, Vol. II., pp. 70–99.)

Salmon, E. S.—Mycological Notes. I., Formation of Ascospores in *Erysiphe Graminis*; II., Mycophagous Larvae feeding on Conidia of Erysiphaceae. (Journ. Bot., Vol. 42, pp. 182–186.)

Salmon, E. S.—On the Identity of *Ovulariopsis*, Patouillard and Hariot, with the conidial stage of *Phyllactinia*, Lév. (Annales Mycologici, Vol. II., pp. 438–444, t. 7.)

Scott, D. H.—Germinating Spores in a fossil Fern-Sporangium. (New Phytologist, Vol. III., pp. 18–23, Figs. 60 and 61.)

Scott, D. H.—On the Occurrence of *Sigillariopsis* in the Lower Coal-Measures of Britain. (Ann. Bot., Vol. XVIII., pp. 519–521.)

Oliver, F. W., and Scott, D. H.—On the Structure of the Palaeozoic Seed *Lagenostoma Lomaxi*, with a statement of the evidence upon which it is referred to *Lyginodendron*. (Phil. Trans. Roy. Soc. B., Vol. 197, pp. 193–247, tt. 4–10, and Figs. 1 and 2 in text.)

Worsdell, W. C.—The Structure and Morphology of the "Ovule." An Historical Sketch. (Ann. Bot., Vol. XVIII., pp. 57–86, Figs. 1–27.)

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